



SEQUENCE LISTING

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<120> Compositions and Methods for Altering Amino Acid Content of Proteins

<130> 5718-16

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<141> 1997-12-10

<160> 11

<170> PatentIn Ver. 2.0

<210> 1

<211> 218

<212> PRT

<213> Glycine max

<400> 1

Arg Ser Ser Glu Val Lys Cys Ala Ser Phe Arg Leu Ala Val Glu Ala
1 5 10 15

His Asn Ile Arg Ala Phe Lys Thr Ile Pro Glu Glu Cys Val Ser Pro
20 25 30

Thr Lys Asp Tyr Ile Asn Gly Glu Gln Phe Arg Ser Asp Ser Lys Thr
35 40 45

Val Asn Gln Gln Ala Phe Phe Tyr Ala Ser Glu Arg Glu Val His His
50 55 60

Asn Asp Ile Phe Ile Phe Gly Ile Asp Asn Thr Val Leu Ser Asn Ile
65 70 75 80

Pro Tyr Tyr Glu Lys His Gly Tyr Gly Val Glu Glu Phe Asn Glu Thr
85 90 95

Leu Tyr Asp Glu Trp Val Asn Lys Gly Asp Ala Pro Ala Leu Pro Glu
100 105 110

Thr Leu Lys Asn Tyr Asn Lys Leu Leu Ser Leu Gly Phe Lys Ile Val
115 120 125

Phe Leu Ser Gly Arg Tyr Leu Asp Lys Met Ala Val Thr Glu Ala Asn

130

135

140

Leu Lys Lys Ala Gly Phe His Thr Trp Glu Gln Leu Ile Leu Lys Asp
145 150 155 160

Pro His Leu Ile Thr Pro Asn Ala Leu Ser Tyr Lys Ser Ala Met Arg
165 170 175

Glu Asn Leu Leu Arg Gln Gly Tyr Arg Ile Val Gly Ile Ile Gly Asp
180 185 190

Gln Trp Ser Asp Leu Leu Gly Asp His Arg Gly Glu Ser Arg Thr Phe
195 200 205

Lys Leu Pro Asn Pro Met Tyr Tyr Ile Glu
210 215

<210> 2

<211> 218

<212> PRT

<213> Glycine max

<400> 2

Arg Thr Pro Glu Val Lys Cys Ala Ser Trp Arg Leu Ala Val Glu Ala
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His Asn Ile Phe Gly Phe Glu Thr Ile Pro Glu Glu Cys Val Glu Ala
20 25 30

Thr Lys Glu Tyr Ile His Gly Glu Gln Tyr Arg Ser Asp Ser Lys Thr
35 40 45

Val Asn Gln Gln Ala Tyr Phe Tyr Ala Arg Asp Leu Glu Val His Pro
50 55 60

Lys Asp Thr Phe Val Phe Ser Ile Asp Asn Thr Val Leu Ser Asn Ile
65 70 75 80

Pro Tyr Tyr Lys Lys His Gly Tyr Gly Val Glu Lys Phe Asn Ser Thr
85 90 95

Leu Tyr Asp Glu Trp Val Asn Lys Gly Asn Ala Pro Ser Leu Pro Glu
100 105 110

Thr Leu Lys Asn Tyr Asn Lys Leu Val Ser Leu Gly Phe Lys Ile Ile
115 120 125

Phe Leu Ser Gly Arg Thr Leu Asp Lys Gln Ala Val Thr Glu Ala Asn
130 135 140

Leu Lys Lys Ala Gly Tyr His Thr Trp Glu Lys Leu Ile Leu Lys Asp
145 150 155 160

Pro Gln Pro Ser Thr Pro Asn Ala Val Ser Tyr Lys Thr Ala Ala Arg
165 170 175

Glu Lys Leu Ile Arg Gln Gly Tyr Asn Ile Val Gly Ile Ile Gly Asp
180 185 190

Gln Trp Ser Asp Leu Leu Gly Gly His Arg Gly Glu Ser Arg Thr Phe
195 200 205

Lys Leu Pro Asn Pro Leu Tyr Tyr Ile Gln
210 215

<210> 3

<211> 214

<212> PRT

<213> Lycopersicon esculentum

<400> 3

Leu Lys Cys Thr Thr Trp Arg Phe Val Val Glu Thr Asn Asn Leu Ser
1 5 10 15

Pro Trp Lys Thr Ile Pro Glu Glu Cys Ala Asp Tyr Val Lys Glu Tyr
20 25 30

Met Val Gly Pro Gly Tyr Lys Met Glu Ile Asp Arg Val Ser Asp Glu
35 40 45

Ala Gly Glu Tyr Ala Lys Ser Val Asp Leu Gly Asp Asp Gly Arg Asp
50 55 60

Val Trp Ile Phe Asp Val Asp Glu Thr Leu Leu Ser Asn Leu Pro Tyr
65 70 75 80

Tyr Ser Asp His Arg Tyr Gly Leu Glu Val Phe Asp Asp Val Glu Phe
85 90 95

Asp Lys Trp Val Glu Asn Gly Thr Ala Pro Ala Leu Gly Ser Ser Leu
100 105 110

Lys Leu Tyr Gln Glu Val Leu Lys Leu Gly Phe Lys Val Phe Leu Leu
115 120 125

Thr Gly Arg Ser Glu Arg His Arg Ser Val Thr Val Glu Asn Leu Met
130 135 140

Asn Ala Gly Phe His Asp Trp His Lys Leu Ile Leu Arg Gly Ser Asp
145 150 155 160

His Gly Lys Thr Ala Thr Thr Tyr Lys Ser Glu Arg Arg Asn Ala Met
165 170 175

Val Glu Glu Gly Phe Arg Ile Val Gly Asn Ser Gly Asp Gln Trp Ser
180 185 190

Asp Leu Leu Gly Ser Ser Met Ser Tyr Arg Ser Phe Lys Leu Pro Asn
195 200 205

Pro Met Tyr Tyr Ile Leu
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<210> 4
<211> 217
<212> PRT
<213> Phaseolus vulgaris

<400> 4
Ser Asp Thr Glu Val Arg Cys Ala Ser Trp Arg Leu Ala Val Glu Ala
1 5 10 15

Gln Asn Ile Phe Gly Phe Glu Thr Ile Pro Gln Gln Cys Val Asp Ala
20 25 30

Thr Ala Asn Tyr Ile Glu Gly Gly Gln Tyr Arg Ser Asp Ser Lys Thr
35 40 45

Val Asn Gln Gln Ile Tyr Phe Phe Ala Arg Asp Arg His Val His Glu
50 55 60

Asn Asp Val Ile Leu Phe Asn Ile Asp Gly Thr Ala Leu Ser Asn Ile
65 70 75 80

Pro Tyr Tyr Ser Gln His Gly Tyr Gly Ser Glu Lys Phe Asp Ser Glu
85 90 95

Arg Tyr Asp Glu Glu Phe Val Asn Lys Gly Glu Ala Pro Ala Leu Pro
100 105 110

Glu Thr Leu Lys Asn Tyr Asn Lys Leu Val Ser Leu Gly Tyr Lys Ile

115

120

125

Ile Phe Leu Ser Gly Arg Leu Lys Asp Lys Arg Ala Val Thr Glu Ala
130 135 140

Asn Leu Lys Lys Ala Gly Tyr Asn Thr Trp Glu Lys Leu Ile Leu Lys
145 150 155 160

Asp Pro Ser Asn Ser Ala Glu Asn Val Val Tyr Lys Thr Ala Glu Arg
165 170 175

Ala Lys Leu Val Gln Glu Gly Tyr Arg Ile Val Gly Asn Ile Gly Asp
180 185 190

Gln Trp Asn Asp Leu Lys Gly Glu Asn Arg Ala Ile Arg Ser Phe Lys
195 200 205

Leu Pro Asn Pro Met Tyr Tyr Thr Lys
210 215

<210> 5

<211> 214

<212> PRT

<213> *Arabidopsis thaliana*

<400> 5

Pro Asn Cys Arg Ser Trp His Leu Gly Phe Glu Thr Ser Asn Met Ile
1 5 10 15

Asn Phe Asp Thr Val Pro Ala Asn Cys Lys Ala Tyr Val Glu Asp Tyr
20 25 30

Leu Ile Thr Ser Lys Gln Tyr Gln Tyr Asp Ser Lys Thr Val Asn Lys
35 40 45

Glu Ala Tyr Phe Tyr Ala Lys Gly Leu Ala Leu Lys Asn Asp Thr Ile
50 55 60

Asn Val Trp Ile Phe Asp Leu Asp Asp Thr Leu Leu Ser Ser Ile Pro
65 70 75 80

Tyr Tyr Ala Lys Tyr Gly Tyr Gly Thr Glu Asn Thr Ala Ala Gly Ala
85 90 95

Tyr Trp Ser Trp Leu Val Ser Gly Glu Thr Pro Gly Leu Pro Glu Thr
100 105 110

Leu His Leu Tyr Glu Asn Leu Leu Glu Leu Gly Ile Glu Pro Ile Ile
115 120 125

Ile Ser Asp Arg Trp Lys Lys Leu Ser Glu Ile Thr Ile Glu Asn Leu
130 135 140

Lys Ala Val Gly Val Thr Lys Trp Lys His Val Ile Leu Lys Pro Asn
145 150 155 160

Gly Lys Leu Thr Gln Val Val Tyr Lys Ser Lys Val Arg Asn Gly Leu
165 170 175

Val Arg Gln Gly Tyr Asn Ile Val Gly Ile Ile Gly Asp Gln Trp Ala
180 185 190

Asp Leu Val Glu Asp Thr Pro Gly Arg Val Phe Lys Leu Pro Asn Pro
195 200 205

Leu Tyr Tyr Val Pro Ser
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<210> 6
<211> 220
<212> PRT
<213> *Arabidopsis thaliana*

<400> 6
Ser Ile Asn Tyr Pro Asn Cys Arg Ser Trp His Leu Gly Val Glu Thr
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Ser Asn Ile Ile Asn Phe Asp Thr Val Pro Ala Asn Cys Lys Ala Tyr
20 25 30

Val Glu Asp Tyr Leu Ile Thr Ser Lys Gln Tyr Gln Tyr Asp Ser Lys
35 40 45

Thr Val Asn Lys Glu Ala Tyr Phe Tyr Ala Lys Gly Leu Ala Leu Lys
50 55 60

Asn Asp Thr Val Asn Val Trp Ile Phe Asp Leu Asp Asp Thr Leu Leu
65 70 75 80

Ser Ser Ile Pro Tyr Tyr Ala Lys Tyr Gly Tyr Gly Thr Glu Asn Thr
85 90 95

Ala Pro Gly Ala Tyr Trp Ser Trp Leu Glu Ser Gly Glu Ser Thr Pro
100 105 110

Gly Leu Pro Glu Thr Leu Tyr Leu Tyr Glu Asn Leu Leu Glu Leu Gly
115 120 125

Ile Glu Pro Ile Ile Ser Asp Arg Trp Lys Lys Leu Ser Glu Val
130 135 140

Thr Val Glu Asn Leu Lys Ala Val Gly Val Thr Lys Trp Lys His Leu
145 150 155 160

Ile Leu Lys Pro Asn Gly Ser Lys Leu Thr Gln Val Val Tyr Lys Ser
165 170 175

Lys Val Arg Asn Ser Leu Val Lys Lys Gly Tyr Asn Ile Val Gly Asn
180 185 190

Ile Gly Asp Gln Trp Ala Asp Leu Val Glu Asp Thr Pro Gly Arg Val
195 200 205

Phe Lys Leu Pro Asn Pro Leu Tyr Tyr Val Pro Ser
210 215 220

<210> 7

<211> 219

<212> PRT

<213> Arabidopsis thaliana

<400> 7

Ser Ile Asn Tyr Ala Asn Cys Arg Ser Trp His Leu Gly Val Glu Thr
1 5 10 15

Ser Asn Ile Ile Asp Phe Asp Thr Val Pro Ala Asn Cys Lys Asp Tyr
20 25 30

Val Glu Asp Tyr Leu Ile Thr Ser Lys Gln Tyr Gln Tyr Asp Ser Lys
35 40 45

Thr Val Cys Lys Glu Ala Tyr Phe Tyr Ala Lys Gly Leu Ala Leu Lys
50 55 60

Asn Asp Thr Val Asn Val Trp Ile Phe Asp Leu Asp Asp Thr Leu Leu
65 70 75 80

Ser Ser Ile Pro Tyr Tyr Ala Lys Tyr Gly Tyr Gly Thr Glu Lys Thr
85 90 95

Asp Pro Gly Ala Tyr Trp Leu Trp Leu Gly Thr Gly Ala Ser Thr Pro

100

105

110

Gly Leu Pro Glu Gly Leu Tyr Leu Tyr Gln Asn Ile Ile Glu Val Gly
115 120 125

Ile Glu Pro Ile Ile Leu Ser Val Arg Trp Lys Leu Trp Lys Asn Val
130 135 140

Thr Leu Asn Leu Glu Ala Ala Gly Val Thr Tyr Trp Lys His Leu Ile
145 150 155 160

Leu Lys Pro Asn Gly Ser Asn Leu Arg Gln Val Val Tyr Lys Ser Lys
165 170 175

Val Arg Asn Lys Leu Val Lys Lys Gly Tyr Asn Ile Val Gly Asn Ile
180 185 190

Gly Asp Gln Trp Ala Asp Leu Val Glu Asp Thr Pro Gly Arg Val Phe
195 200 205

Lys Leu Pro Asn Pro Leu Tyr Tyr Val Pro Ser
210 215

<210> 8

<211> 218

<212> PRT

<213> Glycine max

<400> 8

Arg Ser Ser Glu Met Lys Cys Ala Ser Phe Arg Leu Ala Val Glu Ala
1 5 10 15

His Asn Met Arg Ala Phe Lys Thr Ile Pro Glu Glu Cys Met Glu Pro
20 25 30

Thr Lys Asp Tyr Met Asn Gly Glu Gln Phe Arg Met Asp Ser Lys Thr
35 40 45

Val Asn Gln Gln Ala Phe Phe Tyr Ala Ser Glu Met Glu Met His His
50 55 60

Asn Asp Met Phe Ile Phe Gly Met Asp Asn Thr Met Leu Ser Asn Ile
65 70 75 80

Pro Tyr Tyr Glu Lys His Gly Tyr Gly Val Glu Glu Phe Asn Glu Thr
85 90 95

Leu Tyr Asp Glu Trp Val Asn Lys Gly Asp Ala Pro Ala Leu Pro Glu
100 105 110

Thr Leu Lys Asn Tyr Asn Lys Leu Met Ser Leu Gly Phe Lys Met Val
115 120 125

Phe Leu Ser Gly Arg Tyr Leu Asp Lys Met Ala Val Thr Glu Ala Asn
130 135 140

Leu Met Lys Ala Gly Phe His Thr Trp Glu Gln Leu Ile Leu Lys Asp
145 150 155 160

Pro His Leu Met Thr Pro Asn Ala Leu Ser Tyr Lys Ser Ala Met Arg
165 170 175

Glu Asn Met Leu Arg Gln Gly Tyr Arg Ile Val Gly Met Ile Gly Asp
180 185 190

Gln Trp Ser Asp Leu Leu Gly Asp His Met Gly Glu Ser Arg Thr Phe
195 200 205

Lys Leu Pro Asn Pro Met Tyr Tyr Met Glu
210 215

<210> 9
<211> 218
<212> PRT
<213> Glycine max

<400> 9
Arg Ser Ser Glu Met Lys Cys Ala Ser Phe Arg Leu Ala Val Glu Ala
1 5 10 15

His Asn Met Arg Ala Phe Lys Thr Ile Pro Glu Glu Cys Met Glu Met
20 25 30

Thr Lys Asp Tyr Met Asn Gly Glu Gln Phe Arg Met Asp Ser Lys Thr
35 40 45

Val Asn Gln Gln Ala Phe Phe Tyr Ala Ser Glu Met Glu Met His His
50 55 60

Met Asp Met Phe Ile Phe Gly Met Asp Asn Thr Met Leu Ser Asn Ile
65 70 75 80

Pro Tyr Tyr Glu Lys His Gly Tyr Gly Met Glu Glu Phe Asn Glu Thr
85 90 95

Met Tyr Asp Glu Trp Met Asn Lys Gly Asp Ala Pro Ala Leu Pro Glu
100 105 110

Thr Leu Lys Asn Tyr Asn Lys Leu Met Ser Leu Gly Phe Lys Met Val
115 120 125

Phe Met Ser Gly Arg Tyr Met Asp Lys Met Ala Val Thr Glu Ala Asn
130 135 140

Leu Met Lys Ala Gly Met His Thr Trp Glu Gln Leu Ile Leu Lys Asp
145 150 155 160

Pro His Leu Met Thr Pro Asn Ala Met Ser Tyr Lys Ser Ala Met Arg
165 170 175

Glu Asn Met Leu Arg Gln Gly Tyr Arg Ile Val Gly Met Ile Gly Asp
180 185 190

Gln Trp Ser Asp Leu Met Gly Asp His Met Gly Glu Ser Arg Met Phe
195 200 205

Lys Leu Pro Asn Pro Met Tyr Tyr Met Glu
210 215

<210> 10

<211> 218

<212> PRT

<213> Glycine max

<400> 10

Arg Ser Ser Glu Met Lys Cys Ala Ser Phe Arg Leu Ala Val Glu Ala
1 5 10 15

His Asn Met Arg Ala Phe Lys Thr Met Pro Glu Glu Cys Met Glu Met
20 25 30

Thr Lys Asp Tyr Met Asn Gly Glu Gln Phe Arg Met Asp Ser Lys Thr
35 40 45

Val Met Gln Gln Ala Phe Phe Tyr Ala Ser Glu Met Glu Met His His
50 55 60

Met Asp Met Phe Ile Phe Gly Met Asp Asn Thr Met Leu Ser Asn Met
65 70 75 80

Pro Tyr Tyr Glu Lys His Gly Tyr Gly Met Glu Glu Met Asn Glu Thr

85

90

95

Met Tyr Asp Glu Trp Met Asn Lys Gly Asp Ala Pro Ala Leu Pro Glu
100 105 110

Thr Leu Lys Asn Tyr Asn Lys Leu Met Ser Leu Gly Phe Lys Met Val
115 120 125

Phe Met Ser Gly Arg Tyr Met Asp Lys Met Ala Val Thr Met Ala Asn
130 135 140

Leu Met Lys Ala Gly Met His Thr Trp Glu Gln Leu Ile Leu Lys Met
145 150 155 160

Pro His Met Met Thr Pro Asn Ala Met Ser Tyr Lys Ser Ala Met Arg
165 170 175

Glu Asn Met Leu Arg Gln Gly Tyr Arg Ile Val Gly Met Ile Gly Asp
180 185 190

Gln Trp Ser Asp Leu Met Gly Asp His Met Gly Glu Ser Arg Met Phe
195 200 205

Lys Leu Pro Asn Pro Met Tyr Tyr Met Glu
210 215

<210> 11

<211> 675

<212> DNA

<213> Glycine max

<400> 11

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catgaatggc gaacaatttc gaatggactc taaaacagtt aaccaacagg ctttctttta 180
tgctagtgaa atggaaatgc atcacaacga catgttata ttccggcatgg ataacaccat 240
gctctcta atccccatact atgaaaaaca tggatatggg gtggaggaat ttaatgaaac 300
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caaaatggcc gtaacagaag caaaccta atgaggctggc ttccacacat gggagcagtt 480
aattctcaag gatccacatc ttatgactcc aatgcactt tcatacaaat cagcaatgag 540
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tctgcttggc gaccacatgg gcgaatctag aaccttaag cttcctaata ccatgtacta 660
catggaggcgc gcccgc 675